BURNS IN THE THIRD WORLD: AN UNMET NEED

BRÛLURES DANS LE TIERS MONDE: DES BESOINS À SATISFAIRE

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SUMMARY. Burns continue to present a significant public health problem, resulting in scores of preventable deaths and disability every year. The burden of burns disproportionately falls to the world's poor residing in low and middle-income countries (LMICs). Those who are burnt require timely access to acute burns management, including definitive surgical care. The current lack of access to safe and affordable surgical care with anaesthesia worldwide means that some 5 billion people do not have access to acute burns management, including definitive surgical care for burns, when needed most. Major limitations to access to burn care at healthcare facilities in LMICs include a lack of appropriately trained staff (including surgeons), appropriate equipment and resources. Burn prevention measures have been successful in reducing the incidence of burns and deaths in many developed countries, however there is currently a paucity of robust understanding of what works in LMICs to prevent burns. A combined effort to implement proven burn prevention strategies and address the unmet need for access to safe and affordable surgical care with anaesthesia is required to reduce the global burden of burns that still exists.

Keywords: burns, prevention, treatment, low-income, healthcare

RÉSUMÉ. *Les brûlures demeurent un problème de santé publique, en raison du nombre de décès et de handicaps préventibles survenant annuellement. Le risque de brûlure est particulièrement élevé parmi la population pauvre des pays en développement (PED). Les brûlés doivent recevoir des soins adaptés, y compris chirurgicaux, en temps et heure. Le manque actuel de structures chirurgicales (et anesthésiques) sécurisées et financièrement abordables place les 5 milliards d'humains les plus à risque en dehors des structures de prise en charge des brûlés. Les limitations à l'accès aux soins pour brûlés dans les PED comprennent l'absence de soignants entraînés (chirurgiens inclus), d'équipement, de moyens. Si les mesures de prévention ont permis de réduire l'incidence des brûlures et de leur mortalité dans nombre pays développés, on ne sait actuellement clairement ce qui serait efficace dans les PED. Des actions préventives combinées au développement de structures capables de prendre en charge correctement (à un coût raisonnable pour les patients) les brûlés sont nécessaire pour réduire le risque et les conséquences des brûlures, toujours très élevés dans les PED.*

Mots-clés: *brûlures, prévention, traitement, santé publique, pays en développement*

Introduction

Burns and burn-related injuries are still a major public health problem. Every day, over 30,000 people suffer new burns worldwide, severe enough to warrant medical attention, equating to an estimated 11 million new burns each year globally.[1,2] This burden of burn injury is borne disproportionately by the world's poor residing in low- and middle-income countries (LMICs). Fire-related burns contribute the most to this burden; however burns from scalding, electrical, chemical and industrial burns are also important types to consider. Death from burns is amongst the leading causes of death globally, however this represents just the tip of the iceberg of a much larger public health issue. For every death from burns, far more people are left with lifelong disabilities and disfigurement, and are frequently plunged into poverty and societal isolation.

Epidemiology

Worldwide, 70% of all burns occur in LMICs. Over two-thirds of all burns occur in African and South-East Asian regions. Epidemiological studies from African countries demonstrate that up to 80-90% of burns occur in the home.[3-7] Fire-related burns are the most common type of burn, with over 90% occurring at home. Children under the age of 15 in LMICs are more often burnt than children in HICs, typically secondary to scalding or flames.[3,8] The most common age group for women is 16-35 years;[9] burns are one of the few injury mechanisms with a higher incidence and death toll among women than men.

A staggering 200-300,000 people die from fire-related burns each year. The mortality rate from burns, like its incidence, is disproportionately greater in LMICs. Fire-related burns are the 6th leading cause of death among females aged 15-29 years. The death rate from burns in boys under 5 years

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of age in WHO Eastern Mediterranean and African regions is twice that of the WHO European Region.[2] According to the World Bank divisions on income level, and the WHO Global Burn of Disease Database (2002), there is a 7-fold increase in burn deaths in low/middle income regions compared to high-income regions of Europe. The South-East Asia Region, considered a low/middle income level according to the World Bank, has some 184,000 burn deaths per year, or 11.6 per 100,000 population, accounting for a staggering 59% of the entire global mortality from burns due to fires. This is in stark contrast to high-income group regions including The Americas, Eastern Mediterranean and the Western Pacific regions, where they account for 1.3, 0.02 and 0.6% - not even 2% combined - of global mortality due to fires.[1,9]

Risk factors

Risk factors for burns vary between regions, age groups, sexes and country GDP.[10] Young girls, particularly in LMICs, are at risk of burns at home, particularly in the kitchen.[8,11] The use of potentially unsafe kerosene cooking appliances and open fires at floor level, and wearing traditionally loose clothing and wraps are seen as significant risk factors for flame-related burns in younger women aged 16-35 years.[2,9,11] Adult males are typically most at risk for burns in the workplace, second to exposure to flames, scalds and faulty electrical wiring.[12,13] Children under the age of 15 are at increased risk of burns, with 84% of all paediatric burns occurring at home, particularly in the kitchen, where 80% of the time the child is unsupervised.[2] The unsupervised use of homemade fireworks by children during festivals also increases the incidence of burns in LMICs.[11] Babies and young infants one year or under are at most risk from burns from bed netting and sleepwear, second to faulty electrical wiring and simple devices such as mosquito coils. In addition, local traditional practices of hot water baths for mothers immediately after childbirth, and treating convulsions in children with fire are added risk factors for burns, unique to some African countries.[14] Unfortunately, burns from intentional exposure to chemicals, including chemical assaults, are also seen in LMICs, mostly inflicted upon males as violent crimes or as a crime-of-passion.[15-18] Intentional burns from flames are also suffered by females in the 20-30 age group due to suicide attempts, or assaults by men.[8,19] Living in an LMIC, being unemployed and thus socioeconomic status, alcohol, tobacco and illicit drug consumption are all independent risk factors for burns.[9] Civilians living in situations of armed conflict are at high risk of burns, with approximately 9% of all civilian injuries during conflict due to burns (2009), creating a huge burden of disease.[20,21] An estimated 10-12% of all injuries sustained by military during conflict are due to burns, with a survey conducted in Baghdad, Iraq demonstrating an almost 4-fold increase in the incidence of civilian burns after the second Iraq War in 2003.[20,22]

Burn care as a component of surgical care and universal health coverage

Lack of access to safe, affordable and timely surgical care and anaesthesia continues to be a major global health problem, and one that is affecting the delivery of appropriate burn care, with an estimated 5 billion people worldwide currently without access to this kind of care. Access to surgical care and anaesthesia is mostly lacking in LMICs, where 9 out of 10 people cannot access basic surgical care. One-third of all deaths worldwide in 2010 were from conditions requiring surgical care.[23,24] In 2015, The World Health Assembly unanimously passed resolution 68.15 to strengthen surgical care and anaesthesia as a component to achieving universal health coverage (UHC),[25,26] which unquestionably includes definitive burn care. Surgical care and anaesthesia are an integral part of UHC: safe, timely and affordable surgical and anaesthesia care represent an integral strategy for achieving many of the sustainable development goals through UHC and will greatly augment the acute and chronic surgical treatment of burns.

Acute burns management is defined as the initial resuscitation of the patient, including early assessment and definitive protection of the airway (requiring skills in anaesthesia), prevention of further burning by cooling (using clean, cool running water), IV access and fluid resuscitation, estimation of burn area and severity, basic dressings to prevent secondary infection and evaporative heat and fluid losses, as well as definitive burn care.[27] In many situations, burns are suffered during explosions (domestic or industrial), intentional assaults or motor vehicle accidents, therefore technical skills, equipment and expertise are also required to receive and manage the potential life threatening injuries of a trauma patient. Definitive surgical care with regard to burns includes the technical expertise and equipment to perform escharotomy, wound debridement, split skin grafting (SSG) and scar contracture release.[27] Additionally, the provision of pain management, including opioid analgesia, is important in burns care, particularly during dressing changes. Pain management during dressing changes in the paediatric population can be a challenging domain, and may require the provision of procedural sedation or general anaesthesia.

There have been significant advances in burn prevention and acute burns management in HICs over the last few decades, with a reduction in the incidence and severity of burns, length of hospital stay and mortality rate.[13] Burn prevention strategies in HICs, such as educational programs, community implementation of smoke detectors, controlled hot water temperature systems, and flame resistant sleepwear for children have all been shown to significantly reduce burn incidence rates.[28-30] Moreover, burn prevention strategies in HICs have been shown to be immensely cost effective, with every US$ spent on smoke detectors saving the healthcare system US$28.[31] Additionally, recent advances in burn care, including improved resuscitation of burn victims through fluid replacement therapy, intensive care and renal replacement therapy and nutritional support have contributed to reducing burn victim mortality rate in HICs.[32-35] Improved infection control in burn victims has also been a significant factor in reducing the number of deaths from burns.[32,36,37] Advancements in the surgical care of burn patients, as well as changes in clinical practice such as early excision of eschar, early referral to outpatient dressings management and referrals to small burns units, and outpatient rehabilitation and carer support programmes have led to a downward trend in burn incidence, burn severity and length of hospital stay in HICs.[35,38-41]

The financial cost of burn-related injuries for the healthcare system is significant. In 2013, it was estimated that the mean total healthcare cost per burn patient in an HIC is US$88,000.[2] The United States of America spends in excess of US$211 million (2000) per year on care for burn victims.

South Africa has estimated that US$26 million is spent annually on the care of burn victims of kerosene (paraffin) cooking stove incidents alone.[2] More difficult to measure are the indirect costs for those who suffer burns and their care givers, such as lost wages, the ongoing cost of prolonged care for deformities and emotional trauma.

Acute management and surgical care of burns in LMICs

Using the World Health Organisation's (WHO) Situational Analysis Tool (SAT), Joseph and colleagues at the WHO performed an assessment of 1137 healthcare facilities of 32 LMICs, looking at their ability to perform acute burns management and definitive surgical care in relation to burns.[42] Surgical interventions performed (wound debridement, acute burns management, split skin grafting (SSG), contracture release) and equipment and supplies relating to emergency and essential surgical care can be assessed.[1] The WHO SAT also asks respondents a series of questions as to why they cannot perform a particular procedure. Of the healthcare facilities surveyed, 77.5%, or 1036 out of 1137 facilities, stated that they performed "acute burns management" as defined above, with only 37% able to provide definitive surgical care including wound debridement, split skin grafting and scar contracture release. Thus, 63% of the surveyed healthcare facilities were unable to provide burns surgical care, necessitating referral to a national referral centre. Of these facilities unable to perform definitive surgical care, in 53% of cases they lacked appropriate surgical skills/personnel, just over half of the facilities had non-functioning surgical and/or anaesthetic equipment despite surgical skills being available, and 45% of the facilities stated they lacked the appropriate supplies or medications.[42] Despite access to acute burns management in many healthcare facilities in LMICs, a large majority of those suffering more severe burns worldwide are still unable to access the definitive surgical care they need in a timely manner. Upscaling surgical care with anaesthesia, investment in surgical education and training, and surgical and anaesthetic equipment, drugs and consumables is desperately required to address this global burden.

Burn prevention strategies in the developing world

In LMICs, where different risk factors contribute to the incidence of burns, few studies exist with actual measured outcomes on burn prevention. Given that the overwhelming majority of burns, burn-related deaths and morbidity occur in LMICs, a greater understanding of what works to prevent burns in LMICs is needed. To date, only a few studies have systematically reviewed which burn prevention strategies have a positive impact on burns in LMICs.[43,44] Education-based initiatives have been shown to be effective in reducing the incidence of burns and potentially hazardous behaviours. These education-based initiatives include those that are delivered at home, with and without the use of safety devices, in schools and community groups, and within industry with the use of video safety practices.[45-50] The cost effectiveness of burn prevention strategies in LMICs has not largely been studied. In India however, replacing kerosene lamps - often implicated in burns – with LED or solar powered lamps resulted in a reduction in the incidence of burns, and also in annual household lighting consumption.[51] Such burn prevention strategies in an LMIC setting are extremely promising as those who suffer burns in LMICS, and their caregivers, are at risk of financial catastrophe secondary to paying for surgery and anaesthesia, as well as ongoing care.

WHO response to burn prevention and care

In response to the disproportionate burden of burns in LMICs, the World Health Organization (WHO), the International Society for Burn Injuries (ISBI) and other stakeholders from 14 different countries met in Geneva in 2007 to establish a global strategy for the prevention and treatment of burns, and to highlight the public health problem, emphasising the disparity in LMICs. From this meeting, the publication 'A WHO Plan for Burn Prevention and Care' was developed, outlining: 1) advocacy; 2) policy writing for burn prevention and care guidelines; 3) collection of burns data to understand the magnitude and burden as well as risk factors, largely through the establishment of a Global Burn Registry; 4) research; 5) promotion of effective burn prevention programmes and national burn strategies in LMICS; 6) service strengthening for acute burns care, rehabilitation and recovery, and finally, 7) capacity building within LMICs.[9]

In 2011 the WHO Violence and Injury Prevention (VIP) Programme published 'Burn Prevention – Success stories, Lessons learned'.[30] Recognising that in LMICs additional risk factors for burns exist, the WHO presented examples of successful burn prevention strategies on a global perspective, from a wide range of economic situations. It contains specific examples of encouraging burn prevention efforts in LMIC settings, including the introduction of safer stoves in Guatemala through the RESPIRE Trial, the design and production of a tip-resistant kerosene lamp, and the violence prevention initiatives championed by the Acid Survivors Foundation. The WHO VIP Programme is extremely active in its advocacy and guidance on violence and injury prevention measures, particularly in LMICs.[52]

Conclusion

Globally, a large majority of burns are preventable. The greater burden of burn incidence, mortality and morbidity is borne by the world's poor, residing mostly in LMICs. Burns in LMICs share many similar risk factors and epidemiological traits with those that occur in HICs, however there are some differences. As demonstrated through successful community-based burn prevention strategies in HICs, many of the risk factors contributing to the overwhelming burden of burn disease are eminently preventable. People who are burnt require timely access to acute burns management, including definitive surgical care. Burn care is unquestionably a component of emergency and essential surgical care with anaesthesia. The current lack of access to safe and affordable surgical care with anaesthesia worldwide means that some 5 billion people do not have access to acute burns management, including definitive surgical care for burns, when needed most. Major limitations to access to burn care at healthcare facilities in LMICs include a lack of appropriately trained staff (including surgeons), and appropriate equipment and resources. There is currently a lack of robust understanding of what works in LMICs to prevent burns. Therefore, collecting data on burns as well as promoting research into burns in LMICs is needed. A combined effort to implement burn prevention strategies and address the unmet need of access to safe and affordable surgical care with anaesthesia is required to reduce the global burden of burns that still exists.

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